



REVIEW ON VALUE CHAIN ANALYSIS OF WHEAT AND BARLEY, IN ETHIOPIA

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Abstract: Ethiopia is known to be the centre of cereal crops diversity with significant value chain through its enormous potential to empower and economically liberate the farmers. But, its biggest challenge is having a chain that is linked and fully integrated at national and regional levels, responsive to all players along the chain including smallholder farmers and the ultra poor. As a result the full potential of the sector is hampered by high cost of doing business driven largely by high transportation and other costs along major transit/trade corridors handling the nation's grain trading. Therefore, the specific objectives of the paper were to review different literatures on wheat and barley value chain, market structure and to review different findings on determinants and opportunity of wheat and barley level of supply in Ethiopia. To develop this seminar document, secondary information and findings collected from various databases in URL, were reviewed rephrased and organized. Primarily, the availability and quality of seeds and inputs needs to be improved through investments in breeding, agronomic research, and mechanization, best agronomic practices need to be adopted by, in order to improve value chain efficiency and reduce consumer prices SMHF should be aggregated. The empirical review concluded the relevance and requirements of interventions in the area of agricultural research and institutional innovations to increase flow of information to farmers in fostering increased market participation and agricultural development.

Key words: Value chain, crops, economically liberate, competitiveness, wheat, barley

Introduction: Ethiopia is one of the Sub-Saharan African countries which liberalized

their economies and developed poverty reduction strategies that underpin market-led strategies for broad based agricultural development and economic growth (MoI, 2001). In particular, the liberalization of the Ethiopian grain economy has undergone successive adjustments in lifting restriction on private trade, rejection of government trading monopolies and

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removing official price setting (Legesse *et al.*, 1992; Eleni, 2001).

As the economy of the country is based on agriculture, agro-processing industries to national economic growth are significant. Ethiopia is known to be the centre of diversity of cereal crops. Cereal production and marketing are the means of livelihood for millions of households in Ethiopia. It is the single largest sub-sector within Ethiopia's agriculture, far exceeding all others in terms of its share in rural employment, agricultural land use, calorie intake, and contribution to national income (Rashid S, 2010).

Rational for review: Cereal production and marketing constitute the single largest sub-sector in Ethiopian economy. It accounts for roughly 60 percent of rural employment, 80 percent of total cultivated land, more than 40 percent of a typical household's food expenditure, and more than 60 percent of total caloric intake. The contribution of cereals to national income is also large. According to available estimates, cereal production represents about 30 percent of gross domestic product (World Bank, 2007).

A review of literature in agro-industry value chain indicates that the sector faces many challenges due to limited seed supply, market outlets, limited efforts in market linkage activities (institutionalization) and poor market information among actors (Dereje, 2007; Kaleb, 2008; Dendena *et al.*, 2009). Correspondingly, Mamo (2012) argued that small scale, dispersed and unorganized producers are unlikely to exploit market opportunities as they cannot attain the necessary economies of scale and lack bargaining power in negotiating prices. There are some empirical studies conducted on agricultural value chains in Ethiopia, therefore this review is important to know; what is the finding of different author's? About value chain analysis of cereal crops in Ethiopia and used to conclude what the gaps on value chain analysis of cereal crops in Ethiopia.

Objectives of the Seminar: To review different literatures on wheat and barley value chain and market structure, to review different findings on determinants and opportunity of wheat and barley level of supply in Ethiopia.

Methodology: This seminar was conducted by identifying relevant players and stakeholders along the Wheat, Barley and Teff value chain in Ethiopia. The study used only secondary data. The data were collected from relevant sources such the CSA, Ethiopian Grain Trading Enterprise (EGTE) and FAO database, workshop proceedings, published and unpublished documents in the URL. The information and findings collected were reviewed and organized to develop this seminar document.

Wheat and Barley Value Chain Analysis in Ethiopia: The value chain was described and popularized by Michael Porter in his 1985 in *Competitive Advantage: Creating and sustaining superior performance*. The value chain categorizes the generic value adding activities of an organization into primary and support activities. The primary activities include: inbound logistics (production), outbound logistics (sales and marketing, and maintenance). The support activities include: administrative, infrastructure, management, HRM, R&D, and procurement.

The ultimate goal of value chain is to maximize value creation while minimizing costs. The costs and value drivers are identified for each value activity. Meaning of value can be categorized in different ways. Value is low price. Value is what is wanted. Value is the quality received for the price paid. Value is that which is received for what is given.

Value chain in agriculture is an innovation that enhances or improves (in the opinion of the consumer) an existing product, or introduces new products or new product uses. This allows the farmer to create new markets, or differentiate a product from others and thus gain an

advantage over competitors. In so doing, the farmer can ask a higher premium (price) or gain increased market share or access. Adding value does not necessarily involve altering a product; it can be the adoption of new production or handling methods that increase a farmer's capacity and reliability in meeting market demand. Value-added can be almost anything that enhances the dimensions of a business. The key is that the value-adding activity must increase or stabilize profit margins, and the output must appeal to the consumer (AAFC, 2004).

The value chain analysis allows the firm to understand the parts of its operations that create value and those that do not. It's a template or model that firms use to understand their cost position and identify multiple means of implementation for a chosen business-level strategy. The value chain is segmented into primary and support activities. Over the past twenty years, wheat production and consumption have both increased in Ethiopia despite the existence of strong markets for potential substitute grains. The Ethiopian government has played an active role in wheat markets, such as making large investments in extension programs and adopting protectionist policies to ensure government control of all commercial grain imports. Despite these efforts, Ethiopia is expected to face a growing supply deficit in the absence of increased domestic productivity and/or changes to government policy.

Wheat Seed Research and Distribution in Ethiopia: The Ethiopian agricultural research system (EARS) is coordinated by the Ethiopian Institute of Agricultural Research (EIAR). The network is composed of 55 research centers and sites, including five federal research centers, six regional research centers, Debre Zeit Agricultural Research Center (which serves as the hub for durum wheat research), and Haramaya University. These sites are located

in diverse agro-ecological zones; for example, durum wheat research is conducted at 21 testing sites that study four environments: potential rain-fed areas, waterlogged vertisols, low moisture stress, and irrigated lowlands. Members of the EARS receive support from the International Maize and Wheat Improvement Center (CIMMYT) in the form of germplasm exchange and capacity building through short- and long-term training.

Since 1966, 30 improved durum wheat varieties have been released in Ethiopia from research centers, including 13 from materials obtained from CIMMYT. The International Center for Agricultural Research in Dry Areas (ICARDA), USDA, and the Borlaug Global Rust Initiative (BGRI) have also collaborated with Ethiopian researchers. Despite this strong research system, seed distribution remains largely informal and farmer-to-farmer exchanges account for as much as 90% of the seed trade. The government-owned Ethiopian Seed Enterprise (ESE) is the only public sector organization involved in seed production, processing, and distribution (Kathryn et al., 2012).

Byerlee et al. (2007) argue that increased private sector participation would strengthen the Ethiopian seed system, which is currently failing to meet the needs of many farmers. The ESE is not able to provide a sufficient supply of seeds; in 2005, the quantity of wheat seed supplied by the ESE was only 20% of the quantity demanded according to regional bureau predictions. Farmers have also reported problems with ESE-supplied seed quality, including poor cleaning, low germination rates, and the presence of mixed seeds. Finally, several surveys have found that seed distribution often occurs after the optimal planting time and is not coordinated to ensure that the varieties distributed are appropriate to changes in the farmers' expectations about the weather.

Wheat Value Chain in Ethiopia: Over the past twenty years, wheat production and

consumption have both increased in Ethiopia despite the existence of strong markets for potential substitute grains. The Ethiopian government has played an active role in wheat markets, such as making large investments in extension programs and adopting protectionist policies to ensure government control of all commercial grain imports. Despite these efforts, Ethiopia is expected to face a growing supply deficit in the absence of increased domestic productivity and/or changes to government policy.

Production: According to 2010 estimates from FAOSTAT, Ethiopia is the largest wheat producer in Sub-Saharan Africa, producing 3,000,000 MT. Wheat is generally planted in the summer, before the *meher* (main) season rains in June-September, and then harvested in October-November. The majority (59-75%) of wheat is grown in the region of Oromia, particularly the Arsi-Bale wheat belt that begins just north of Addis Ababa and extends to the southeast. Amhara region is also a major producer, and these two regions accounted for 88% of domestic production in the 2006/07 season.

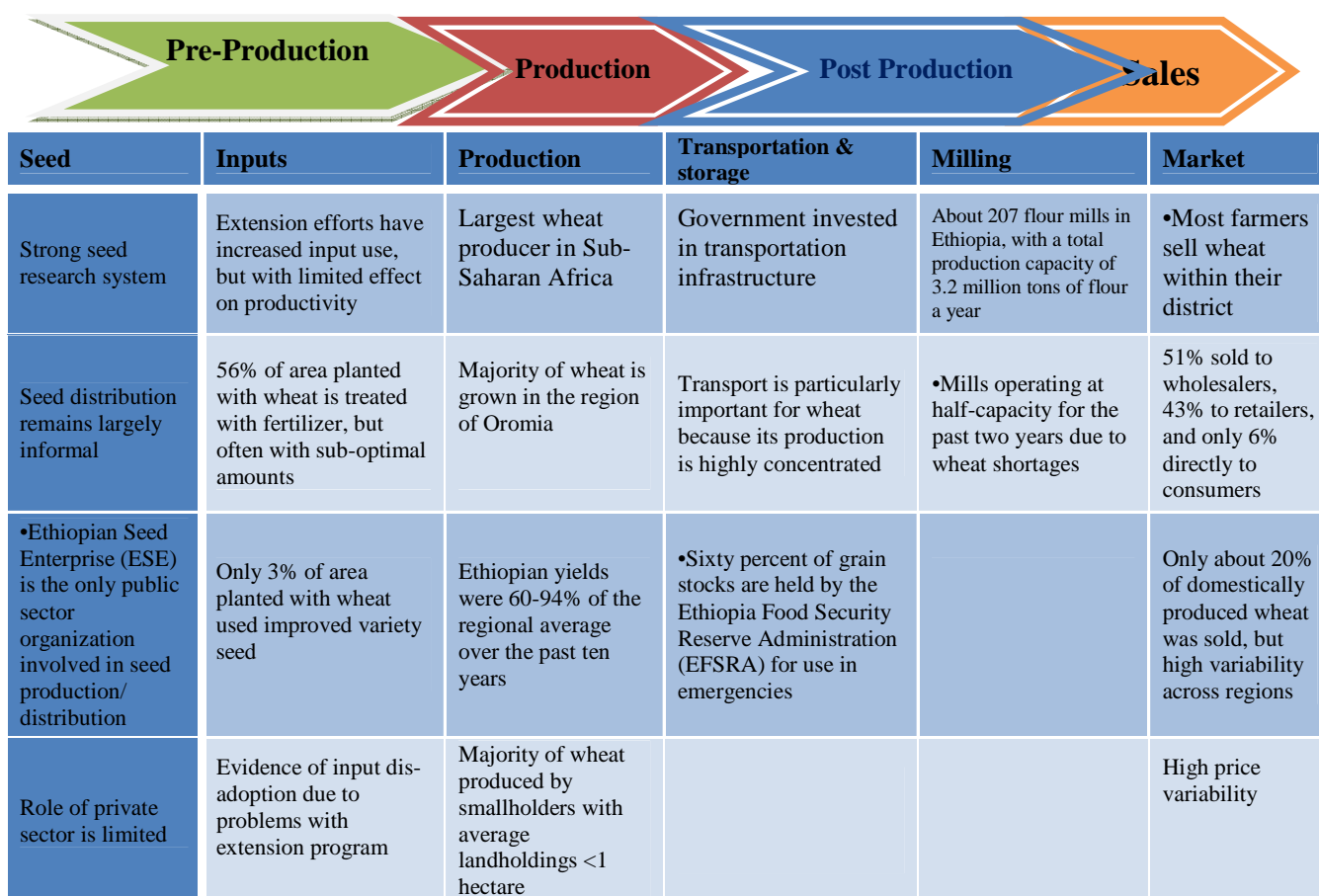
Transportation and Storage: The Ethiopian government prioritized investment in the transportation infrastructure in the mid-late 1990s. In 2007, almost 62% of the population was within 5 hours travel time of a city of at least 50,000 people (compared to only 33% in 1994). While every region except Gambela has a city of at least 50,000 people, only 5-13% of the population in any region is within one hour travel time of a city. In Oromia region, 9% live less than one hour from a city, and another 18% are 1-3 hours away. A transportation infrastructure is particularly important for wheat due to the concentration of wheat production in the Amhara and Oromia regions, which means that strong distribution channels are necessary to transport wheat to deficit areas that may be hundreds of miles away from surplus production

zones. The government controls the supply chain in urban areas through the Ethiopian Grain Enterprise (EGTE) distribution, but transportation in rural areas is decentralized.

Milling: The USDA FAS (2012b) estimates there are around 207 flour mills in Ethiopia, with a total production capacity of 3.2 million tons of flour a year. About a third of the mills are in the Addis Ababa area, including most of the large ones. Millers can either purchase domestically produced wheat or imported wheat from the EGTE, which comprises about a quarter of the market. The EGTE offers millers imported wheat at a subsidized price, but caps the price of flour that is produced from that wheat. Millers who want to buy from the EGTE must register with the Ministry of Trade, and the amount of wheat they can purchase is based on their production capacity. Only 59 bakeries and flour mills, mostly near Addis Ababa, are registered to purchase EGTE wheat since mills in rural areas generally purchase domestically produced wheat. However, there are no price controls on non-EGTE wheat, and it is more expensive. Due to wheat shortages, most of the mills have been operating at half-capacity for the past two years.

Sales: Participants in the Ethiopian wheat market include wholesalers, retailers, part-time farmer-traders, brokers, processors, cooperatives, the EGTE, and private consumers.⁴⁷ The EGTE purchases grain from farmers to stabilize markets and encourage increased outputs. A 2005 smallholder survey found that the majority of farmers sold wheat at markets inside their district; 66% of producers sold their wheat at the nearest market outside of the peasant association (PA), 20% sold at markets within the PA, and only 11% sold at district town markets.⁴⁹ About 51% sold to wholesalers, 43% to retailers, only 6% directly to consumers.

Fig-1. Summarizes key findings along the different stages of the wheat value chain in Ethiopia.



Sources: Kathryn.*et.al* (2012)

Determinants of Wheat Value Chain in Ethiopia: Muhammed (2011) revealed that, Alaba Qulito sample market was inefficient and characterized by oligopolistic wheat market structure. The major barrier to enter into the market was shortage of capital. Moreover, the markets were overwhelmed by information asymmetry with low degree of market transparency. Although trading of wheat is profitable across all sample farmers and traders, problems like oligopolistic market structure and information asymmetry made the trading business uncompetitive and inefficient. Among the different variables hypothesized to determine the supply of wheat, econometric (OLS) result showed that three variables namely quantity produced, access to credit and price of

other (pepper) crop significantly affected volume of wheat supplied to the market. A mission from the Food and Agriculture Organization (FAO) and the World Bank (1982) had also reported that inadequate price incentive was among the major factors behind the sluggish performance of the Ethiopian Agriculture. The report was based on the assumption that peasants' response to price is positive. Also a study in Alaba Siraro district by Wolday (1994), he identified that size of output was significantly and positively affected wheat supplied. Family size also significantly and positively affected quantity supplied of wheat. Shephard *et.al* (2011) finds out determinants of cereal market participation by sub-Saharan Africa smallholder farmer using probit model. They indicated that five household

characteristics and private assets variables significantly explained the probability to participate in the cereal grain market as a seller: household size, experience, cultivated land, animal draft power and radio. Household size was negatively associated with the probability to sell cereal grains. This probably means that households with large family sizes tend to fail to produce marketable surplus beyond their consumption needs.

This could be reflective of high dependency ratios for large households. The household's farming experience was rather surprisingly negatively associated with probability to sell cereal grains. Explanation for this unexpected outcome is not apparent. Perhaps more farming experience could be associated with older farmers who are less inclined to cash crop. The land area cultivated was as expected positively associated the probability to sell cereal grains as well as ownership of a radio.

Amongst public infrastructure and services variables considered in the model, price information, Average distance to output markets in the village in km, National road density index, measured as km per 1000 people and ICT were the ones significantly influencing the probability that a household enters the cereal market. As expected, access to price information was positively associated with the probability of entering cereal market. Access to information, provided through national radio programmes or from extension agents, reduces risk perceptions. Negassa.*et.al* (2004) argues that spatial inefficiency within Ethiopian wheat markets prevents wheat from being transferred from the regions in which surpluses are generated to those in which demand outpaces production. One possible explanation for this failure is that the marketing system lacks the capacity to provide timely and accurate price signals, which present special challenges given the price instability. The riskiness of the wheat market may also reduce private sector participation, particularly in rural areas where distribution costs may be higher.

Value chain analysis of Barley in Ethiopia:

Barley is the fourth most important cereal crop in worldwide production and international trade after wheat, maize and rice. It is grown annually on 48 million hectares in a wide range of environments (FAO, 2007). In some developing countries, barley grows with relatively less rainfall as compared to other crops such as wheat, and thus can be mostly grown by resource poor farmers in marginal environments, receiving modest inputs (Fantahun, 2010).

Barley accounts for over 60% of total food crops in many parts of the highlands of Ethiopia. It accounts for about 13% of the total area of major cereal crops and 10% of the total annual cereal production (CSA, 2011). Malt barley currently produced in large quantities in central highlands of Ethiopia. Particularly in Oromia region; mainly in the south eastern parts Arsi and Bale Administrative zone, Amhara, Tigray and Southern Nations, Nationalities and People Region account for about 99.5% of the total annual malt barley production.

Malt barley is a premium form of barley grain which accounts for up to 30% of traded barley. Its importance is mainly as raw material for malt production for use by breweries in the country (Getachew. *et al.*, 2007). The demand for malt in Ethiopia is being met through imports (that accounts for about 69%) and partially through domestic production. The direct raw material, other than water, used for the production of malt in Ethiopia is malt barley. Likewise, malt is the major raw material for beer production, which is about 90% of the total raw material cost. There are six breweries in Ethiopia. These breweries need about 45,679 tonnes of malt every year.

Asella Malt Factory (AMF) is a very good example of a positive agro-industrial link, making a very important two-way linkage between farmers and breweries. The proximity of the factory to the malt barley producers has also helped strengthen the link between farmers and the factory (Tadesse, 2006). The interesting aspect of malt barley production in Ethiopia is that the crop has double purposes. It

is used for food (bread, and several traditional dishes) and also for malting. As a result, there are different competing alternative channels for the crop making it a sustainable source of income for smallholder farmers in Arsi and Bale highlands (Getachew *et al.*, 2007).

Malt barley has been the only crop with a sustainable market for farmers in Arsi, which includes Tijo-Digalu, Sagure, Tiyo, and Lemu-Bilibilo, parts of the Assassa, Kofele, Shashemane and Genale districts. AMF's yearly malt barley purchase from these places is about 22000 tones, worth more than 44 million Birr (Taddese, 2006).

Production and marketing of malt barley in Ethiopia: The malt barley is differentiated from the food barley by the different varieties characterized by low protein but high carbohydrate values, yielding a higher extraction rates during processing. Malt Barley is mainly grown in Arsi and West-Arsi production area (Oromia region), in North and South Gondar (Amhara region) (Agritera, 2012).

The maltery at St. George Brewery formerly obtained its malting barley from farmers and state farms in Arsi. Then small-scale research was also conducted at Deberezeit and Holetta Agricultural Research Centers to verify the suitability of imported malting barley varieties, such as 'Beka', 'Holker' and 'Proctor'. The varieties, released by the research centers and those imported from abroad as basic seed, were distributed to the farmers and state farms by the then Chilalo Agricultural Development Unit-Arsi Rural Development Unit that was operating in Arsi (Taddese, 2006).

Currently, 94% of the total malt barley supply comes from small-scale farmers and only 6% is supplied by state farms. The barley variety used for malting plays an important role in determining the malt quality and consequently the beer produced from it. The two malt barley varieties under production are 'Holker' and 'Beka'. These varieties are very old (in commercial production for more than 30 years)

and have lost some of their important agronomic and brewing quality advantages.

The two major locations where malt barley is currently produced in large quantities are the highland areas on the western side of the Galema belt (the Tiyo, Degelu and Tijo and Bokoji Woredas) and the highland areas of the Kofele and Shashemene Woredas on the south western side of Arsi. These areas are known historically as the best food barley production sites in Ethiopia, and hence malt barley also performs well. Amigna Seru Woreda in Arsi and Genale Woreda in Bale are also identified as potential malt barley production areas (Taddese, 2006).

The major market places are in woredas from the two zones of Arsi that include Shashemene, Kofele, Serufta, Siltana, Bokoji, Merarro, Degelu, Tijo and Sagure. Most of the malt barley produced is supplied to the factory by individual merchants. In most cases there are at least two market participants in the supply chain between the producer and the factory. Small merchants collect the barley from the farmers and supply to the large buyers. The large buyers in turn supply to AMF in trucks.

Thus the profit is shared among the farmers, the small merchants and the large buyers. To avoid this ladder and to make the farmer the prime beneficiary, efforts are being made to organize farmers' service cooperatives and unions to collect the barley from the farmer and supply directly to the factory. At present, the factory's yearly malt barley purchase from these places is about 22000 tones, worth more than 44 million Birr (Taddese, 2006).

Major constraints of malt barley production and marketing: According to the findings of (Mahilet, 2013) several factors affect the production of malt barley in the study areas. The major problems in malt barley production are input supply specifically fertilizer and improved malt barley seed (37%), price setting (65.8%), shortage of land (30%), credit service (20%), lack of sound extension service (54.27%) and drought, soil erosion and frost (38.3%).

On the other hand the findings of (Yadete T.B., 2012) finds that, insufficient Agricultural input suppliers in local market , Skill gap (shortage) for OSE staff and stake holder, Integration with suppliers system, Hidden costs or wastages, Accessibility to customers by OSE & AMF, are highly identified problems.

Opportunities of malt barley production and marketing of malt Barley: The opportunities refer to the external favourable conditions that are in favour of malt barley production and marketing. Some of the opportunities of malt barley production in Tiyo and Lemu-Bilbilo Districts in Arsi Zone, Oromia National Regional State, Ethiopia include availability of potential and suitable areas, support service

providers, variety adaptation trial, the existence of malt factory in the area, expansion of breweries and access to foreign market (Mahilet, 2013).

Another study (Yadete, 2012) finds that, the establishment of new Breweries and Malt Factories in the country, The expansion of Asella Malt Factory (AMF) that increases its annual demand from 300,000 qt. to 560,000 qt. of malt barley and its proximity to the neighbouring districts, The construction of roads and infrastructural development in the country and Government policies and structures that focuses towards Agriculture and its marketing linkages, etc as opportunities of malt barley production and marketing of malt Barley.

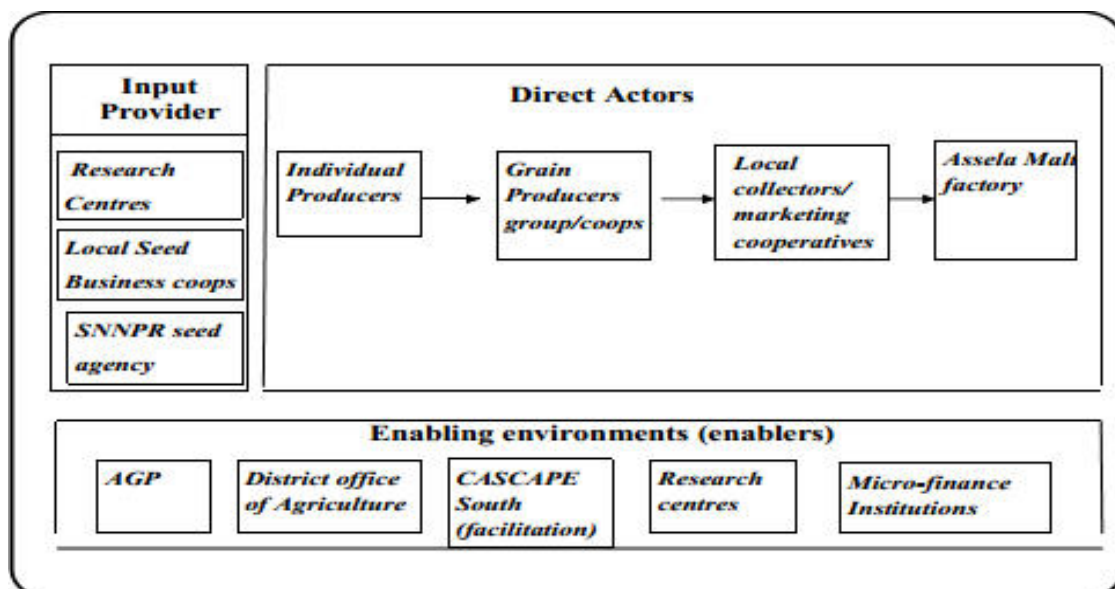


Fig-2. Value chain map of malt barley

Conclusions: From the empirical review we can conclude that relevance of interventions in the area of agricultural research and institutional innovations is needed to increase flow of information to farmers in fostering increased market participation and agricultural development. The findings were of particular relevance to Integrated Agricultural Research for Development whose focal interventions are innovation platforms. The innovation platforms

encourage increased linkage and information flow among farmers and all relevant agricultural players along the value chains.

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